

Cost Control

A MANAGEMENT GUIDE

10



NATIONAL PRODUCTIVITY COUNCIL

ABOUT NPC

The National Productivity Council is an autonomous organization registered as a Society. It is tripartite in its constitution and representatives of Government, employers, workers and various other interests participate in its working. Established in 1958, the Council conducts its activities in collaboration with institutions and organisations interested in the Productivity Drive. Besides its headquarters at New Delhi, NPC operates through eight Regional Directorates. In addition there are 49 Local Productivity Councils.

The purpose of NPC is to stimulate productivity consciousness in the country and to provide service with a view to maximizing the utilization of available resources of men, machines, materials and power; to wage war against waste; and to help secure for the people of the country a better and higher standard of living. To this end, NPC collects and disseminates information about techniques and procedures of productivity. In collaboration with Local Productivity Councils and various institutions and organizations, it organizes and conducts training programmes for various levels of management in the subjects of productivity. It has also organised an advisory service for industries to facilitate the introduction of productivity techniques.

Recognizing that for a more intensive productivity effort, the training and other activities of NPC, designed to acquaint management with productivity techniques, should be supported by demonstration of their validity and value in application, NPC offers a Productivity Survey and Implementation Service (PSIS) to industry. The demand for this service has been rapidly growing. This Service is intended to assist industry adopt techniques of higher management and operational efficiency consistent with the economic and social aspirations of the community. PSIS is a highly competent consultancy service concerned with the investigation of management and operational practices and problems, and recommendation of measures of improvement and their implementation. NPC has established a special Fuel Efficiency Service. It has set up cells for servicing small scale industries. It has introduced a National Scheme of Supervisory Development under which an examination is held and certificates awarded to successful candidates. NPC also conducts a two-year practice-oriented programme for training in Industrial Engineering for first class graduates in Engineering disciplines.

NPC publications include pamphlets, manuals and reports of productivity teams. NPC utilizes audio-visual media of films, radio and exhibitions for propagating the concept and techniques of productivity. Through these media NPC seeks to carry the message of productivity and create an appropriate climate for increasing national productivity.

MANAGEMENT GUIDE

COST-CONTROL

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CONTENTS

	PAGE No.
<i>Preface</i>	v
INTRODUCTION	1
COST ACCOUNTING	2
DEFINITION	2
MAJOR OBJECTIVES OF KNOWING COSTS	2
CLASSIFICATION & INTERPRETATION OF COSTS	2
CLASSIFICATIONS USEFUL FOR RECORDING COSTS AND FOR DECISION- MAKING	2
CLASSIFICATION FOR RECORDING COSTS	3
AREAS OF RESPONSIBILITY	3
JOB, PROCESS OR PRODUCT	3
DIRECT AND INDIRECT COSTS	3
FIXED, VARIABLE AND SEMI-VARIABLE COSTS	3
NORMAL CLASSIFICATION AND FUNCTIONAL CLASSIFICATION OF COSTS	4
CLASSIFICATION NOT USUALLY USED FOR RECORDING PURPOSES	4
OUT OF POCKET VS. SUNK COSTS	4
AVOIDABLE VS. UNAVOIDABLE COSTS	4
RELEVANT VS. IRRELEVANT COSTS	4
OPPORTUNITY COSTS	5
CONTROLLABLE VS. NON-CONTROLLABLE COSTS	5
MARGINAL AND INCREMENTAL COSTS	6
ELEMENTS OF COST	6
DIRECT MATERIAL	6
DIRECT LABOUR	6
DIRECT EXPENSES	7
INDIRECT EXPENSES	7
ACCOUNTING FOR MATERIALS	8
PURPOSE OF ACCOUNTING FOR MATERIALS	8
TREATMENT OF NORMAL AND ABNORMAL LOSSES DUE TO WASTAGE	10
ACCOUNTING FOR LABOUR COSTS	10
TIME-KEEPING	11
ASSIGNING LABOUR COSTS	11
IDLE TIME	11

ACCOUNTING FOR OVERHEAD COSTS	..	11
MEANING OF THE TERM 'OVERHEAD'	..	11
CHARGING DEPARTMENTAL OVERHEAD TO UNITS OF PRODUCTION	..	12
MACHINE-HOUR RATE	..	12
OVERHEAD ADJUSTMENT	..	12
NON-MANUFACTURING OVERHEAD	..	13
COST OF IDLE CAPACITY	..	13
CALCULATION OF GAIN OR LOSS IN OVERHEAD	..	13
PRACTICAL PROBLEMS	..	14
STANDARD COSTING	..	17
A MAJOR AREA OF COST CONTROL	..	17
HOW APPLIED	..	17
HOW TO ASCERTAIN MATERIAL & LABOUR COST VARIANCES	..	18
CONTROLLING COSTS THROUGH VARIANCES	..	19
BREAK-EVEN ANALYSIS	..	21
BREAK-EVEN POINT	..	21
BREAK-EVEN CHARTS	..	23
ALTERNATIVE FORM OF CHART	..	24
QUESTIONS	..	27
SUGGESTED READING	..	28

P R E F A C E

The experience of the National Productivity Council (NPC) over the last ten years has shown that development of supervisory skills contributes significantly to the productivity of an organisation. In view of the rapid industrial developments that have taken place or are expected to take place in the ensuing years, the present arrangements for the supervisory training in India are altogether inadequate. NPC has launched a nation-wide Supervisory Development Scheme through self-study and enterprise level guidance which will prepare the candidates for a professional qualifying examination leading to the award of National Certificate in Supervision.

Apart from making the necessary arrangements for holding the above examination, and providing the specialist services for supervisory training under the usual terms, NPC is also preparing a number of guides covering the main body of the syllabus to be read along with standard textbooks on the subjects. The main purpose of these guides is to give the supervisors and foremen a basic understanding of the topics in a simple and concise manner so as to provide the basic foundations and promote future studies. A list of such guides and other booklets which are being brought out could be seen on the last page of the cover of this publication.

This guide on cost-control has been prepared by Shri G. R. Sarma, Deputy Director, NPC.

The list of reference books for further studies has been given in the prospectus of the National Certificate Examination in Supervision. It must be stressed here that all these guides are not intended as a substitute for enterprise level assistance for supervisory development in the way of training, demonstrations, seminars, etc., but mainly as an aid to these. It goes without saying that these publications will not only help the candidates preparing for the National Certificate Examinations but also others who wish to have some basic understanding of the subjects. It is hoped that managers of all forward looking enterprises will make an all-out effort towards training up their supervisors and workers.



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INTRODUCTION

"What does it cost?" and "How to control costs" are the two important questions asked in the everyday transaction of business and the latter is probably more important to the Supervisor than to any other Junior Executive. If costs are not controlled at the point of incurrence, they spiral up, creating a non-competitive position.

By using a proper uniform cost system, costs can be controlled. Supervisors with efficient knowledge of standard cost finding method realise that cost controls provide an efficiency of operation which could not otherwise be obtained. The first step in the elimination of waste and unnecessary expenses is recognizing their existence. A proper standard cost system will indicate the places where waste and inefficiency exist. It also provides a constant check on the success of measures taken to eliminate waste and inefficiency creeping in in long periods of time before they become recognized. Line supervisors' authority, in lower echelons, and responsibility with regard to cost control are usually limited to authority over and responsibility for (a) Labour (b) Material (c) Operations performed by labour on material. Lower line supervision is currently said to be responsible for prime cost.

Ample records of the various elements entering into the cost of labour, material and the operations performed by labour on material must be kept so that supervision can exercise adequate control over the manufacturing process. Such records, called 'cost records' also have an added use by becoming storehouses of performance information when new jobs or operations are in the planning stage. Such records show the difference in wastage between various employees and also such things as the quantity of materials used and the amount of time used in individual or groups of operations. Cost control endeavours to keep waste material and ineffective use of labour at a minimum.

In addition, as competition in any industry increases, the ability to do jobs on a very small profit or 'break-even margin' will prove to be a most valuable and profitable ability. By knowing the break-even costs of prospective jobs, it will be possible to keep the plant operating at capacity and absorb a considerable portion of the fixed and semivariable expenses — expenses that would otherwise be loaded on to the profitable jobs. In other words, the knowledge of the break-even points of the prospective jobs is the best profit insurance that a supervisor can give his organization.

This guide has been written to emphasise the importance of determining, recording and controlling costs and to encourage supervisors to use the most up-to-date procedures and forms in that regard. Chapters 1 and 2 deal with cost accounting and cost control procedures. Chapter 3 deals with break-even analysis — a very important device for presenting information for making decisions concerning production, and many other matters.

COST ACCOUNTING

Definition

Costing means classifying, recording and allocating the appropriate expenditure for determining the costs of products or services and the presentation of suitably arranged data for the purpose of control and guidance of management.

Major Objectives of Knowing Costs :

The knowledge of costs allows one to give attention to five major objectives :

1. Setting of sales price
2. Control of costs
3. Making of management decisions
4. Evaluation of inventories
5. To serve in developing the organization and in budgetary control

Classification and Interpretation of Costs

Broadly speaking, costs are classified into a series of specified groups, according to their characteristics. Some of the classifications are useful for recording purposes, but others are used only when the specific problem to be solved is known.

Classifications Useful for Recording Costs and for Decision-making

Responsibility (division, plant, department, or other areas of responsibility).
Job process and product. (These are usually referred to as "systems" but they are also methods of classifying costs).

Direct and indirect costs;

Fixed, variable and semi-variable costs;

Natural and Functional classifications not usually used for recording purposes but commonly used for decision-making :

Out-of-pocket *vs.* Sunk costs

Avoidable *vs.* Unavoidable costs

Relevant *vs.* Irrelevant costs

Controllable *vs.* Non-controllable costs

Marginal and Incremental (or differential) costs.

This is by no means all-inclusive, but it gives an indication of the various ways in which costs may be thought of. It may be noted that costs which are relevant for certain decisions will not be relevant for others.

CLASSIFICATION FOR RECORDING COSTS

Areas of Responsibility

The recording of costs by division or by plant is necessary with multi-divisional or multi-plant organisations. To be useful, the various costs must be classified according to the locations where they were incurred. This is also true when we are dealing with one plant organised on a departmental basis. The objective of classifying costs in this manner is to identify all costs according to where they are incurred, so that the responsibility for the cost may be established. Establishing responsibility for costs is the first step towards controlling costs, and the primary function of any cost system is to control costs.

Job, Process or Product

Manufacturing costs may be accumulated by job (the costs of each specific production order are accumulated separately), a manufacturing process and or by type of product.

Direct and Indirect Costs

Certain costs can be easily identified with specific products or processes. These are called direct costs. Costs which cannot be easily identified with product or process are called indirect costs. It is not unusual to restrict the classification "direct" to direct labour and direct material. Even such costs as the glue holding the product together may be classified as an indirect cost, not because it could not be identified with a specific product but because it cannot be easily identified. A physical component of the product being made may have a small unit value, and the cost of treating the item as a direct cost may be excessive when compared to the benefit gained.

Fixed, Variable and Semi-variable Costs

For decision-making purposes, this is one of the most useful classification of costs. Product-pricing and level of production decisions are based on the information supplied by this cost classification. The ability to control costs also depends upon a knowledge of how the costs should react to changes in the level of production.

A *variable* manufacturing cost is one that will vary in total amount directly with production. If production increases 10 per cent, the variable costs will increase by 10 per cent. Examples of variable manufacturing costs are direct labour, direct material and the power necessary to run the machines.

A *fixed* manufacturing cost is cost that is constant in total amount over a wide range of production. Thus, the manager's salary is fixed, as is the depreciation in

the factory. The characteristic of fixed cost (that it is frequently not absolutely fixed) creates the need for the classification of semi-variable costs. Fixed costs are fixed relative to the level of production, but they may change from period to period (for example, salary increases may be given to foremen).

A *semi-variable* cost will increase in a discontinuous manner. Thus, only two foremen may be required for normal production, but if another five labourers are hired, another foreman is required. Thus the need for foreman may be related to direct labour, but it may not be directly proportional to the number of workers.

Normal Classification & Functional Classification of Costs

Labour costs can be classified according to its natural classification i.e. labour or its functional classification, for example, manufacturing. The natural classification can be divided into direct and indirect labour, and then further classified by the exact nature of the labour, for example, material handler, packer etc. Other examples of natural classifications of costs are material, taxes, depreciation. The functional classification includes selling and administrative costs as well as manufacturing costs.

CLASSIFICATION NOT USUALLY USED FOR RECORDING PURPOSES

Many of the items given below have their uses. There are small distinctions that are useful in making decisions. Thus 'sunk costs' and 'unavoidable costs' are very similar, but there is a difference. The difference is useful when it is realised that some costs which are not out of pocket costs (i.e. they are sunk) are still avoidable. Thus the depreciation of a building is a fixed and sunk cost, but it may be avoided if a buyer can be found for the building.

Out of Pocket vs. Sunk Costs

Out of pocket costs require a utilisation of current resources, usually cash or near cash. Sunk costs do not require utilisation of current resources. Out of pocket costs may be fixed (the manager's salary) or variable (material or labour). Sunk costs are usually fixed, but they may also be variable (depreciation of a truck on a production or mileage basis). In some cases a sunk cost may be avoidable (for example, a building sold at a profit avoids building depreciation).

Avoidable vs. Unavoidable Costs

The main pitfall is in assuming that all avoidable costs are variable and out-of-pocket and that all unavoidable costs are sunk. The manager's salary is generally unavoidable, but it is also out-of-pocket. The one true generalisation is that unavoidable costs are fixed.

Relevant vs. Irrelevant Costs

The purpose of this classification is to point out the fact that not all costs are relevant for specific decisions. Thus the book depreciation or book value of a machine

currently being used is not relevant in making the decision whether or not to replace it. In measuring a firm's ability to survive short-run adversity only the out-of-pocket costs are relevant. Thus for each decision, the supervisor must determine which costs are relevant.

Opportunity Costs

The principle of opportunity costs is very important to the analysis of accounting data and to business decision-making. It defines the cost of one course of action in terms of opportunities which are given up in order to carry out that course of action. If an asset can be used to perform only one function and it cannot be used in other ways or sold as scrap the opportunity costs of that asset are zero.

A machine used to make product 'A' will have an opportunity cost if it can also make product 'B'. For example, assume that that period's production of 'B' can be sold for Rs 10,000 and that the costs which vary directly with production are Rs 8,000. The opportunity cost of not producing product 'B' is Rs 2,000. The proceeds that are forsaken by producing 'A' instead of 'B' are actually a cost of producing 'A'. The opportunity cost principle is extremely useful in deciding on alternative uses of productive facilities.

Example

A machine is currently being used to make product 'A' which has a price of Rs. 1.50 per unit and a cost (which varies with production) of Rs. 1.10 per unit. The depreciation of the machine has not been included in that unit cost because it is considered to be a fixed cost. The machine could be used to make product 'B', which could be sold for Rs. 2 per unit and which has variable costs of Rs. 1.20 per unit. Is the machine depreciation relevant in making the decision whether or not to continue producing product 'A'?

Answer

The depreciation of the machine is not relevant, but the opportunity cost of not producing product 'B' is relevant. We must know how many units of product 'B' can be produced per period.

Controllable vs. Non-controllable Costs

This concept is important because, if properly applied, it will help to avoid much confusion in the area of cost control. It is generally accepted that a person should be held responsible for only those costs he can control. A corollary of this is that reports to supervisors should contain only those costs which they control. Thus a foreman of an operating department would not receive a report comparing actual building depreciation with budgeted depreciation. The inclusion of this or like items serves to detract from those items that the foreman can control. The

plant manager is responsible for the most efficient utilization of the factory building; thus, the report measuring his efficiency would include building depreciation.

Marginal and Incremental (or differential) Costs

The marginal cost is the cost added by producing one more unit. The incremental cost (or differential cost) is the cost added by producing more than one unit. Both definitions are extremely important since many decisions are based on marginal or incremental costs.

A practical short cut is often taken and it is assumed that the incremental cost is equal to the variable costs times the number of units to be added, plus any fixed (or semi-variable) costs which have to be added to produce the additional units. This ignores changes in efficiency, but otherwise it is useful approximation.

ELEMENTS OF COST

For accounting purposes costs are grouped under three categories referred to as 'Cost Elements'. These are direct material, direct labour and expenses.

Direct Material

There are two kinds of materials which enter into the factory cost of a product. The material of which the product is made and which can be identified and charged direct to each job, works order or process is called Direct Material.

It includes :

1. All material specially purchased for a particular job, order, or process.
2. All materials (including primary materials and raw materials) acquired and subsequently requisitioned from the stores for particular production orders.
3. Components purchased or produced, and similarly requisitioned from the finished parts store.
4. Material passing from one operation or process to another, e.g., produced, converted, or part manufactured material which is intended for further treatment or operations.
5. Primary packing materials (e.g. cartons, wrappings, cardboard boxes, etc.)
The other is indirect material which forms part of overhead.

Direct Labour

Two distinct classes of labour enter into the production of a manufacturing article. There is the Direct Labour which means labour applied to particular manufacturing operation or job and which can be definitely measured and directly charged to the separate products or jobs. The other is indirect labour which forms part of the overhead.

Expenses

Expenses may be either direct or indirect.

Direct Expenses

There are, however, some expenses other than direct material or direct labour which are directly chargeable to some particular job or contract and these would then be known as Direct or Chargeable Expenses. They include the following :

1. Cost of patterns, drawings or designs specifically prepared for a particular job and which cannot be utilised for other purposes.
2. Cost of any experimental work carried out specifically for a particular job.
3. Cost of carriage or freight inward incurred on supply of special materials directly to the job.
4. Hire of special or single purpose tools or equipment for a particular production order or product.

Indirect Expenses

These are called overheads. These include cost of indirect material, indirect labour and other expenses that cannot conveniently be charged direct to specific cost units. These cover all those expenses which are incurred for the undertaking as a whole and which cannot conveniently be associated with a particular unit of cost. Examples are factory rent, time-keeper's wages, Printing & Stationery, Advertising charges, etc.

Indirect Expenses may be divided into :

1. Factory Expenses or Overhead,
2. Office and Administrative Expenses or Overhead.
3. Selling and Distribution Expenses or Overhead.

Factory Expenses

This covers all indirect expenditure incurred by the undertaking from the receipt of the order until its completion ready for despatch, either to the customer or to finished Goods Stores. It includes indirect materials, indirect labour, power, rent, rates etc., of factory, depreciation and repairs of machinery, etc.

Office and Administration Expenses

This consists of all expenses incurred in the direction, control and administration of an undertaking. It includes rent and rates of office premises, office lighting, salaries of office staff, printing and stationery, postage etc.

Selling and Distribution Expenses

This includes the cost of soliciting and securing orders for the articles or commodities sold and of efforts to find and retain customers. It also includes all expenditure incurred from the time a product is completed in the works until it reaches its destination: for example, salaries of sales staff, publicity and advertisement, catalogues, leaflets and price lists, packing and forwarding charges, godown rent etc. A chart showing how the total cost is made up is given on page 16.

ACCOUNTING FOR MATERIALS

Purpose of Accounting for Materials

In many industries the material costs may account for 60 to 80 per cent of the manufacturing cost. It is therefore most important that the major items are controlled. The purpose of Accounting for materials is threefold:

- (i) To have on hand, when wanted, all material needed by the works;
- (ii) To keep the investment in materials as low as is consistent with deliveries desired;
- (iii) To know the cost of materials on each manufacturing order.

Stores represent money's worth and materials have to be accounted for as carefully and scrupulously as cash or large losses may result. Stores and partly-finished stock represent a considerable fraction of the capitalised value of the firm, on which interest charges must be taken into account to check if the capital may be more profitably employed otherwise. In addition the cost of carrying stores safe from fire, deterioration and damage is frequently of a high order.

Accounting for materials involves the following:

- 1. Determining requirements — Advance planning
- 2. Acquiring materials and components — Purchasing
- 3. Recording cost of materials and components purchased. — Receiving and recording
- 4. Accounting for materials and components purchased. — Issuing or requisitioning.
- 5. Counting and pricing materials on hand — Taking physical inventory.

IMPORTANT STORES RECORDS

STORE-LEDGER

Name :	Minimum level :
Code :	Maximum level :
Quantity to order :	Ordering level :
	Bin Number :

		Receipts			Issues		Balance
Date	G.R. Note No.	Quantity	Rate	Value	M.R. No.	Quantity	Quantity

Stock ledger as shown above should be used for recording materials, receipts and issues. A separate page should be opened for each kind of raw material or purchased component. When invoices have been verified and vouched, the voucher number, the number of units received, the price and the cost in the "receipts" column of the appropriate stock ledger folios should be entered. Issues should be entered in the 'issues' column from material requisitions. Then the quantity on hand as shown in the 'balance' section of the stock ledger folios should be adjusted.

In order to control the issue of material from stores it is necessary to use material requisitions. A proforma is given below:

MATERIAL REQUISITION

Date _____ Requisition Number _____
 For _____ Production Order No. _____
 Department or Operator _____
 Requested by _____

Stores Number	Quantity Requested	Description	Quantity Issued	Unit Cost	Total Cost
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Received by _____ Date _____

Bin Cards are kept at each storage location: These are, paralld to the Stock Control records (Stores ledger accounts) except that money values are not given. A specimen Bin Card is given below :

BIN CARD

Bin No.	Description:
Stores Ledger Folio:	Maximum level:
Code or Symbol:	Ordering level:
	Minimum level:

Date	Receipts		Issues		Balance	
	G.R. Note No.	Quantity	Reqn. No.	Quantity	Quantity	Checked

Treatment of Materials of Small Value

It is often too expensive to maintain detailed records of materials of little individual value which may be necessary to the completed article and strictly forms

part of the prime cost: e.g. glue and nails in the manufacture of toys, nails and thread in the manufacture of footwear, etc. Materials of this character may be dealt with in one of two ways.

- (a) As part of the indirect expenses of the business;
- (b) As a direct charge to production on an estimated basis.

Treatment of Normal and Abnormal Losses Due to Wastage

Certain losses are difficult to avoid. For example, if we order and pay for 100 tonnes of coal, we might actually get only 95 tonnes to use since at the time of loading into lorries and unloading again, losses take place. Some materials may be lost during the course of manufacture. For example in a shoe factory there will be some wastage of leather because the shape of uppers or soles do not permit entire utilisation of every piece of leather. Such losses are considered normal. Normal losses are part of cost of production and the value of the normal loss should be calculated and added to factory expenses. But abnormal losses—losses occurring due to carelessness, accident, fire, theft etc.—are not part of cost of production and the value of such losses should be calculated separately, and excluded from costs. It should be debited to the Profit & Loss Account.

ACCOUNTING FOR LABOUR COSTS

In some manufacturing concerns, labour costs are often a large controllable component of the cost of doing business. Thus, the control of labour costs is an important part of a plan for economic production. Necessary records should be kept to show the results of the rupees spent for labour.

The objectives of accounting for labour costs may be summarised as follows:

1. To assign labour costs to specific jobs, processes or activities, in order to provide a basis for the direction of production.
2. To provide for accurate and prompt payments to employees in a way that will be satisfactory to them.
3. To fulfil legal requirements and provide a basis for the preparation of required reports.

The main activities which contribute to one or more of these objectives are :

1. Time-keeping or recording of employee attendance
2. Assigning labour costs
3. Payroll preparation
4. Recording payrolls
5. Paying payrolls
6. Keeping individual earnings record

Time-keeping

Labour time records must be considered from two points of view : (i) time spent in the factory (for the purpose of making up wages) in the case of time-rated employees, (2) time spent on different jobs, processes or services (for purposes of proper cost allocation). Time spent in the factory may be recorded in various ways according to the size of factory, e.g., checks or discs, and time recording clocks of various types. Time spent on different jobs, processes services, etc., may be recorded by daily or weekly time sheet completed by the worker and signed by the foreman, by job ticket or job card completed by the worker in writing, or in conjunction with time recording clocks, or by piece work tickets. Jobs, processes, services etc., may be indicated by name, number or symbol assigned in production orders. Total time shown as spent on jobs, etc., (in terms of cash, wages abstract total) should agree with total time spent in factory (in terms of cash wages book total).

Assigning Labour Costs

A distinction must be made between direct and indirect labour costs in determining how costs are to be charged. In a process system with limited departments, all factory labour costs can usually be assigned to a process or processes without difficulty. In a jobbing plant, direct labour costs are charged to specific jobs from time ticket summaries or weekly time records, and indirect labour costs are charged to an overhead account and later to jobs by the use of overhead rates.

Idle time—normal and abnormal—treatment in cost accounts

When workers are paid on a time basis, some difference between the time for which they are paid and that which they actually spend on production is bound to arise. This difference is known as idle time and represents the time for which the employer must pay, but from which he obtains no direct advantages. The treatment of idle time in the cost accounts will depend upon whether it may be regarded as normal or abnormal.

ACCOUNTING FOR OVERHEAD COSTS

Meaning of the term "Overhead"

The manufacturing overhead of a factory which is being effectively utilized should be considered as a part of the costs of goods produced. Since by definition manufacturing overhead items cannot be assigned directly to processes or units of product, any cost accounting system will include means for apportionment of these costs. One or more of the following methods may be used for the apportionment of production overhead to departments: (1) direct charges where possible (2) proportionate to (a) departmental wages (b) capital values of buildings and machinery (c) floor area (d) production hours of direct labour (e) number of workers.

Charging Departmental Overhead to Units of Production

1. *As a percentage of direct material*: Useful where one type of article is produced and material costs are stable, otherwise unreliable.
2. *As a percentage of direct wages*: Frequently adopted where there is no great variation in type of labour used, the ratio of skilled to unskilled labour remains fairly constant, and similar machines and equipment are used throughout.
3. *As a percentage of direct material plus direct wages*: A widely used method, easily calculated. It is really a combination of (1) and (2) above.
4. *As a rate per unit produced*: Suitable in works producing uniform units.
5. *As a rate per direct labour hour*: Suitable where labour is the predominant production factor. Rate is obtained by dividing department production overhead by total direct-labour hours. It takes full account of the time factor which largely governs indirect expenses; where costly machines are used in addition to **hand** labour, this method should be used in conjunction with a machine-hour rate.
6. *As a rate per machine-hour*: Suitable where machinery is the predominant production factor. A rate may be fixed for groups of approximately similar machines, but where machines vary widely in size, power consumption etc. separate rates must be fixed.

Machine-hour Rate

Expenditure attributed to a department may be apportioned over the machines engaged in that department. An hourly rate may be ascertained to be charged to jobs using each machine (more commonly a rate is assigned to a group of machines estimated to have approximately the same overhead expenses). The factors to be taken into consideration are (1) Interest on capital outlay; (2) Depreciation, insurance, repairs, maintenance and power; (3) Proportion of any overhead apportionable on the basis of floor space. Labour cost of operating machines is wholly excluded and charged direct to production overhead adjustment.

Overhead Adjustment

Recovered overhead will never exactly account for actual expense. Difference will arise owing to error in estimating output or time worked, or error in estimating recovery rates. Difference may be (a) under-recovered expense or (b) over-recovered expense; and may be (i) transferred to general expenses and adjusted in new rates; (ii) transferred to manufacturing or profit and loss account (iii) carried to an expense adjustment reserve account. When the difference represents unrecovered or under-

recovered expense, it is advisable to write it off to manufacturing or Profit and Loss Account.

Non-manufacturing Overhead

The term "non-manufacturing overhead" is often used to apply to all indirect expenses incurred after production or outside the factory and consists of administrative and selling expense

Accounting for selling and administrative overheads need not be complex for some manufacturers. Costs are recorded when paid or accrued and the resulting expense account balances are closed to the operating summary at the end of year.

These overheads are apportioned to products or services either as a percentage of factory cost or conversion cost.

Cost of Idle Capacity

In order to produce as cheaply as possible the fullest use should be made of plant capacity. Certain time losses are inevitable, but the important point is to keep these to a minimum. This requires the efficient planning and execution of the works ; maintaining the machinery without undue stoppages; and ensuring that the workers are employed effectively. When factory overhead rates are calculated, it is usual to allow for time losses which are regarded as 'normal'. They are, therefore, recovered in the costs of products. An overhead account is maintained for charging the cost of idle time.

When the time losses are large they should receive special attention. If job costing is employed they should be brought to light through the balance of overhead which is under-recovered. With standard costing or budgetary control the overhead volume variance will reveal the extent of the idle capacity. If the idleness is due to a trade recession or other abnormal reason the term used to describe the expense involved is 'idle facilities cost'. Generally speaking, this is written off to the profit and loss account and is not charged to the products.

Calculation of Gain or Loss in Overhead per unit due to rise or fall in workload.

Overheads are not a fixed charge per unit, but vary with the volume of production. They may be divided into two constituents, one fixed and the other variable in relation to volume. In the fixed portion of overheads profit or loss will arise according to whether the actual volume of production exceeds the budgeted output or falls below it.

Example :

Assume a production department having overhead charges per week as follows:	
Costant overhead charge	Rs. 100
Variable overhead charge	Rs. 64 for 80 per cent capacity working
Overhead cost per unit	20.5 P

and that costs have been based on this corresponding to a production of 800 products per week

Suppose now—

(1) The department load drops to a 50 per cent

Constant overhead charge	Rs. 100	
Variable overhead charge	Rs. 40	
Overhead per unit (500 products)		0.28 ps
Loss on overhead per unit		<u>7.5 ps</u>

(2) The departmental load increases to 100 per cent

Constant overhead charge	Rs. 100	
Variable overhead charge	Rs. 80	
Overhead per unit (1,000 products)		18 ps
Gain in overhead per unit		2.5 ps

As overheads are forecast for each trading period, if the volume of production is larger than anticipated they will be over-recovered in a period of prosperity : so the point arises whether this over-recovery should be considered a part of profits. It is suggested that it should rather be carried to a reserve to meet under-recovery in times of low production. This assumes, of course, that prices are stable.

PRACTICAL PROBLEMS

Example

On the basis of the following information derived from the records of a factory, find out what price should be quoted for a job involving an expenditure of Rs. 20,000 in materials and Rs. 30,000 in wages.

	Rs.
Raw materials : opening stock	20,000
Raw materials : closing stock	30,000
Finished goods : opening stock	10,000
Finished goods : closing stock	15,000
Purchases during the year	1,70,000
Wages (direct)	1,20,000
Factory expenses	1,20,000
Non-manufacturing expenses	50,000
Sales	4,89,500

Solution

Let us first of all process the above figures, i.e., prepare a cost sheet of the work done.

COST SHEET

Raw Materials Consumed :

	Rs.	Rs.
Opening stock of raw materials	20,000	
Purchases	<u>1,70,000</u>	
Raw materials available for consumption	1,90,000	
Less closing stock raw materials	<u>30,000</u>	
Materials consumed		1,60,000
Direct wages		<u>1,20,000</u>
Prime cost		2,80,000
Factory Expenses		<u>1,20,000</u>
Factory cost		4,00,000
Non-manufacturing expenses		<u>50,000</u>
Total cost		<u>4,50,000</u>

(It will be noted that we have excluded the opening and closing stocks of finished goods. This is because we want to find out the cost of goods manufactured, and hence cost of goods already manufactured must be excluded. But opening and closing stock of finished goods must be taken into account to find out the profit made.)

Statement of Profit or Loss

	Rs.
Opening stock of finished goods	10,000
Add cost of goods manufactured	<u>4,50,000</u>
Goods available for sale	4,60,000
Less closing stock of finished goods	15,000
Cost of Goods sold	4,45,000
Sales	4,89,500
Profit	<u>44,500</u>

From the above the following percentages can be calculated:

- (a) Factory expenses to wages. 100 per cent
- (b) Non-manufacturing overhead to factory cost, viz., 12-1/2 per cent
- (c) Profit to cost of sales. 10 per cent

We can now prepare the quotation for the job.

QUOTATION

	Rs.
Materials	20,000
Wages	30,000
	<hr/>
Prime cost	50,000
Factory overhead (100 per cent on wages)	30,000
	<hr/>
Factory cost	80,000
Non-manufacturing overhead (12-1/2 per cent on factory cost)	10,000
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Total cost	90,000
Profit (10 per cent on total cost)	9,000
	<hr/>
Estimated selling price	99,000

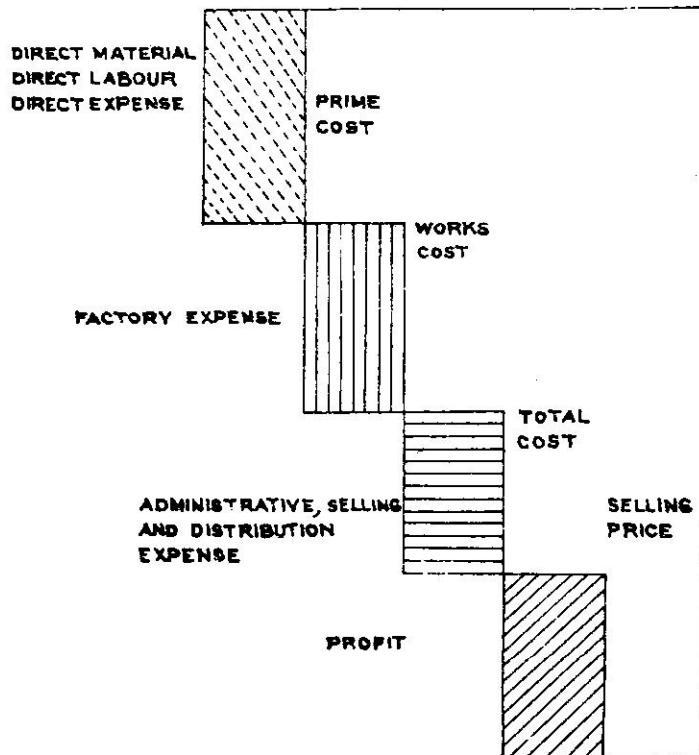


Chart showing how the total cost is made up.

STANDARD COSTING

A Major Area of Cost Control

A standard cost system can be applied either to Jobbing industries or to continuous process industries. A standard cost system indicates what costs should be, not necessarily what they are or will be. Standard costs are different from purely estimated costs in that a standard cost should be attainable by the industry in the future. The efficiency of the various groups that enter into production control can be obtained through the medium of cost control. Standard costs indicate what each item should cost, ideally. By comparing this with the actual, efficiency of operating a department can be determined.

How Applied

Standard costs show what a company's costs should be, based on past experience, plus adjustments to meet current conditions. Standard cost must be attainable. Standard costs set up a definite goal for the firm to meet, provided the proper incentive is available to the workers and supervisors.

Briefly, a standard cost system would be set up in the following manner: First, cost centres must be determined to limit the area of supervision, according to supervisory occupation. Then the various production operations must be determined and expense classifications and overhead must be established within each cost centre by the accounting department. With this data available, the standards for materials, labour and overhead are set and compared with the actual cost at the end of the period. The variances are then noted and examined. In setting standards for material, labour, and overhead, the procedure is to study past data, if available, for inefficiency either in buying, production or performance, to eliminate these inefficiencies to a reasonable degree; and to determine what the attainable standard cost should be.

There are two types of variances between actual and standard costs, quantity and price. The price variance will show additional money spent above the standard price and quantity of material, labour or services used as compared with the standard amount. Once the actual variances are determined, the most important step is to analyse the variances and determine why they exist. Certain variances are controllable but others are uncontrollable. In material variances the costs may be due to an increase in market price, greater or less spoilage by production, or inefficient

purchasing by the purchasing agent. Labour costs may vary because of an increase in wage rates, inefficiency or efficiency on the part of the workers, poor production planning, etc. Overhead costs may vary either because of inefficient use of indirect materials and labour or for the other reasons enumerated above. Finally, the standard cost system will be successful only if the proper incentive is given to the supervisors and workers to achieve the objective of standard or attainable costs.

How to Ascertain Material and Labour Cost Variances?

Suppose, for materials, the standard quantity is 10 units at a standard rate of Rs. 1.50. The standard cost per piece is Rs. 15. Let it also be assumed that the actual cost is Rs. 14.30 on the basis of actual consumption of 11 units at the actual rate of Rs. 1.30 per unit. This will show that there is inefficiency and that saving is due to market factors.

The calculations can be as follows :

MATERIALS	Rs.
Standard 10 units @ Rs. 1.50	15.00
Variance of efficiency (i.e. quantity or usage variance)	
1 unit @ Rs. 1.50	<u>1.50</u>
	16.50
Price variance for 11 units (@20 np. per unit)	2.20
Actual cost. of 11 units @ Rs. 1.30/unit	14.30

Similarly we may have determined that labour cost ought to be Rs. 20- @ Re. 1/- per hour for 20 hours. Suppose the actual labour cost is Rs. 21.60. On investigation we may find that although there was a saving of 2 hours, the wage rate was up by 20 p. per hour so that there is a net increase of Rs. 1.60 in the total wage cost. The figures will be as follows :

LABOUR	Rs.
Standard 20 hours @ Re. 1 per hour	20.00
Variance of efficiency 2 hours @ Re. 1.00 (Time saved)	<u>2.00</u>
	18.00
Price 18 hours @ 20 p. (Rate variance)	<u>3.60</u>
	21.60
Actual 18 hours @ Re. 1.20	

Standard costing affords exact measurement of efficiency in a factory. If the above calculations are made foreman by foreman, we shall know which foreman is efficient (so that he can be ignored by management) and who is not (so that management will concentrate on him to help him improve).

Controlling Costs through Variances

Controlling costs through the medium of reporting and analysing variances over a standard requires consideration of the following items:

1. Standards—against which to measure performances.
2. Report of Variance—showing the deviation from the standards.
3. Analysis—segregation and classification of variances.
4. Action—to correct items that are out of line.

The aim of control of manufacturing costs is to know them better and to reduce them. That is to say, to manufacture a product of a set quality at the least cost possible, consistent with the equipment used in the business.

Manufacturing costs are composed of three elements: *raw materials*, *direct labour* and a *part of the overhead* of the business. That is why we need three standards :

- Standard for raw materials
- Standard for direct labour
- Standard for overhead costs

These standards are expressed :

In weight or volume for raw materials, in hours of work for direct labour in a percentage of expense for overhead costs.

Causes for quantity or efficiency variance: The probable causes for material usage variance may be:

- Poor quality
- Incorrect size or dimensions
- Standards set too high
- Pieces spoiled because of errors on preceding operations
- Waste in cutting and assembling.

Probable causes for labour time variance may be:

- The worker waited for raw materials
- The worker waited for tools
- The worker spent more time than necessary in setting up
- The worker was not trained in the work

The machine broke down
The instructions were not followed by the worker
The time allowed was too short
Some parts had to be done over
Two workers were given the same machine but only one could work at a time.
The work was interrupted because of an emergency.

BREAK-EVEN ANALYSIS

Break-even Point

Break-even Point is that point at which a business neither makes a profit nor incurs a loss.

There are two types of costs : Fixed Costs and Variable Costs.

FIXED COSTS are those which do not increase or decrease in sympathy, though not directly, with the sale or production volume : such as rent, insurance, certain taxes, salaries of top executives and office workers, depreciation etc.

VARIABLE COSTS are those which increase or decrease in sympathy, though not directly, with the sales or production volume. They are basic materials, direct labour, commissions to salesmen, etc.

In theory, if production was zero, fixed costs would not change, but variable costs would be reduced to zero.

In order not to complicate the discussion, it may simply be noted in passing that so called semi-variable costs are those which do not vary directly with production and sales.

The volume of sales can be expressed in rupees or in units of the product.

The break-even-point is the point below which the concern is working at loss. It is the danger line. There are three methods for determining the break-even point—*arithmetic*, *algebraic* and *graphic*. Arithmetic and graphic methods only are discussed below:

ARITHMETIC METHOD : It is simple to determine the break-even point. Four steps are to be followed :

1. Separate fixed from variable costs
2. Calculate the percentage of variable costs to sales
3. Calculate the marginal income, i.e., the difference between 100 and the percentage of variable costs
4. The break-even point is obtained by dividing the fixed costs by the percentage of marginal income.

EXAMPLE

I.	Fixed costs	Rs. 55,000
	Variable costs	Rs. 45 per item
	Selling price	Rs. 100 per item
<hr/>		
II.	Percentage of variable costs to selling price	
	Variable costs	Rs. $\frac{45}{100} = 45\%$
<hr/>		
III.	Profit Margin	100% selling price 45% variable costs 55% marginal income
<hr/>		
IV.	Break-even Point:	Minimum sales
	$\frac{55,000}{55\%}$	Rs. 1,00,000 or 1,000 items

In the above example, Fixed costs	= Rs. 55,000
Variable costs of 1,000 items	= Rs. 45,000
Total Costs	= Rs. 1,00,000
Selling price	= Rs. 1,00,000
Profit	= Rs. 00 (nil)

The business firm sells items for Rs. 100/- each.

First Point : Separate variable from fixed costs. Variable costs are Rs. 45/- per item. They will, for example, include: direct materials, direct labour, salesmen's commission, sales tax, etc.

Fixed costs amount to Rs. 55,000. They will for example include rent, insurance, salaries of top executives and of office workers.

Second Point : After having separated fixed from variable costs the percentage of variable costs to the selling price will be calculated; in our example it amounts to 45%.

Third Point : The marginal income will be calculated as follows :
100% (representing the selling price) minus 45% (variable costs) = 55%.

Fourth Point and Solution :

The break-even point will be calculated, that is the number of products to be sold in order to cover fixed costs. In the example, it amounts to :

$$\text{Rs. } \frac{55,000}{55\%} = \text{Rs. } 1,00,000$$

Therefore, 1,000 units at Rs. 100 each must be sold. A simple example has been chosen but, the principle remains the same in businesses.

Break-even Charts

A BREAK-EVEN CHART is a very useful device for showing management the relationships which exist between costs, volume of output and profit. Many significant facts can be shown on one chart, and the effect of possible changes in the volume of sales can readily be seen.

The chart gets its name from the fact that the break-even point—where there is neither profit nor loss—is indicated clearly and distinctly. However, there is more to the chart than simply showing the break-even point; the division of costs into those which are fixed and those which are variable; the rate at which profit may be earned and (on some charts) the contribution, may also be portrayed. The steps involved in compiling a chart are shown on pages 25 and 26.

The use of graph paper is essential. The axes are divided into suitable class intervals. On the vertical axis are shown costs and revenue; on the horizontal axis a suitable unit of measurement is selected from the following :

Sales—units or values

Production—units or values

Capacity—production and/or sales shown in percentages.

When production or sales capacity is employed as the unit of measurement, the horizontal axis is divided into percentages, the full length of the line normally representing 100 per cent. This is graduated at suitable intervals as 10 per cent, 20 per cent and so on. In the example, Rs. 40,000 would be taken to represent 100 per cent capacity. Strictly speaking, no profit is earned until goods are sold. Accordingly there is a preference for using sales units or values and, therefore, the latter have been employed in the illustration.

The next step is to enter the values for the costs, revenues and sales. It will be seen that in both cases the scale commences at zero.

In this example, the fixed costs total Rs. 10,000.

Since these remain constant, irrespective of the volume of output or sales, they are shown as a straight, horizontal line which runs parallel to the horizontal axis.

Next, the variable costs are entered on the chart. The total of these is Rs. 20,000. They are put above the fixed cost line and slope upwards from left to right commencing at Rs. 10,000 and finishing at Rs. 30,000. Because they are added to fixed cost, the line drawn becomes the total cost line.

The final step is the insertion of the sales revenue line. This stretches from zero sales and goes to the point of maximum sales—in this example Rs. 40,000. Where the sales line and total cost line intersect is the break-even point. Below the point losses occur; above it profits are earned. The rate of earning can be seen from the 'profit wedge'. The vertical width between the sales and total cost lines above the break-even point shows how quickly profit is earned. Furthermore, the relationship between volume of sales and profit earning is portrayed.

In order to illustrate the preparation of break-even charts, it has been necessary to show charts in varying stages of completeness. In practice a break-even chart will normally be prepared in all stages on the one chart.

Alternative Form of Chart

An alternative form of break-even chart shows the contribution as well as profit. For some purposes such as when the contributions made by different products are being compared, this modified chart may be preferred. In the example given (Fig. 2) the figures are the same as those used previously. Comparison of the two forms of chart is, therefore, possible.

The contribution is the difference between sales value and marginal costs. It goes towards reducing fixed costs, any balance remaining being profit.

Reference to the illustration in Fig. 2 will show that the contribution at 100 per cent capacity is as follows :

Sales	Rs. 40,000
Less Marginal (variable) costs	Rs. 20,000
	<hr/>
Contribution	Rs. 20,000
	<hr/>

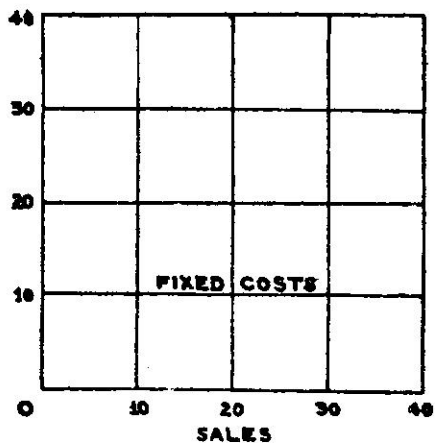
This is used, first of all, to eliminate the fixed overhead costs and then to build up a fund of profit. At total capacity, the profit earned is Rs. 10,000.

Fig. 1

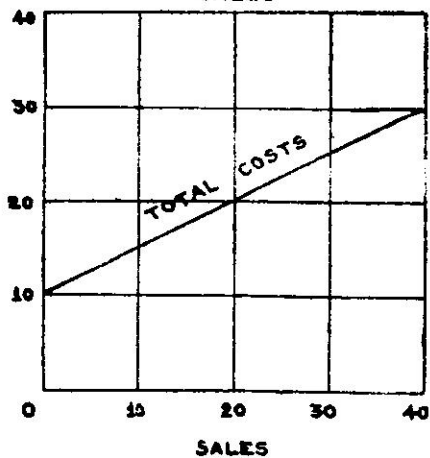
BREAK-EVEN CHART

Rs. 000's

**COST AND
REVENUES**



**COST AND
REVENUES**



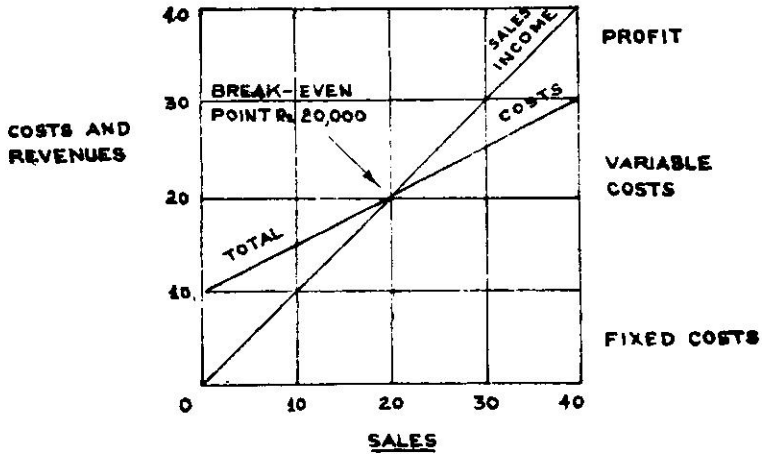


Fig. 2

CONTRIBUTION BREAK-EVEN CHART

Rs. 000's

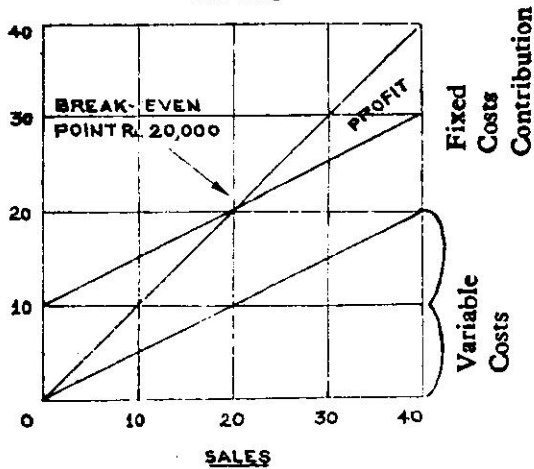


CHART SHOWING HOW THE TOTAL COST IS MADE UP

QUESTIONS

Cost Accounting

1. Why is it necessary to know the costs of products or services of a manufacturing or servicing organisation?
2. Explain by means of a diagram or chart how the total cost is made up.
3. Distinguish between:
 - (a) Direct and Indirect Costs
 - (b) Controllable and Uncontrollable Costs
 - (c) Fixed and Variable Costs
 - (d) Out of Pocket and Sunk Costs
 - (e) Relevant and Irrelevant Costs
 - (f) Marginal and Incremental Costs
4. Explain and illustrate the three cost elements.
5. What is the purpose of Accounting for materials?
6. Draw specimen of : (a) Bin Card, (b) Material Requisition. Explain the utility of these documents for purposes of material and cost control.
7. What are the objectives of accounting for labour costs? How do you treat normal and abnormal idle time in cost accounts?
8. What do you understand by the term overhead? What are the different methods of apportioning overheads?
9. What do you understand by idle capacity? How is the cost of idle capacity treated in cost accounts?
10. As a Supervisor you are required to quote the price for a job to be undertaken under your control. From the following particulars compute the total cost and selling price to be quoted for the job.

Direct material	Rs. 5,000
Manufacturing wages	Rs. 3,000
Factory overhead to manufacturing wages	100%
Non manufacturing overheads to factory cost	12½%
Profit on total cost	10%

Standard Costing

1. What do you mean by 'Standard Cost'? How are standards used for purposes of cost control?
2. How are costs controlled through Variance Analysis?
3. What might be the causes for material usage and labour efficiency variances.

Break-Even Analysis

1. Explain and discuss the utility of Break-even concept?
2. (a) From the following data calculate the break-even point for a manufacturing unit:

Fixed costs	Rs. 1,00,000
Variable costs	Rs. 100 per unit
Selling price	Rs. 200 per unit

- (b) What will be the new Break-Even point if fixed costs are increased to Rs. 1,25,000 and variable costs are reduced to Rs. 90/- per unit?

SUGGESTED READING

1. COST ACCOUNTS by W. BIGG
2. COST ACCOUNTING AND COST METHODS by H.J. WHELDON
3. THE ELEMENTS OF COSTING by G.R. GLOVER and R.A. WILLIAM
4. COST ACCOUNTING by J.G. BLOCKER
5. COST ACCOUNTING & CONTROL by GILLESPIE.

ADDRESSES OF NPC HEADQUARTERS AND REGIONAL DIRECTORATES

HEADQUARTERS

National Productivity Council
Productivity House
5-6 Institutional Area, Lodi Road, New Delhi-110003

REGIONAL DIRECTORATES

1. Regional Directorate
National Productivity Council
Government Polytechnic Building
Old Sachivalaya, Ambawadi
Ahmedabad-380015
2. Regional Directorate Director,
Supervisory Development
National Productivity Council
21, 9th Main Road Jayanagar
Bangalore-560011
3. Regional Directorate
National Productivity Council
Novelty Chambers (7th Floor)
Grant Road
Bombay-400006
4. Regional Directorate
National Productivity Council
9, Syed Amir Ali Avenue
Calcutta-700017
5. Regional Directorate
National Productivity Council
7/155, Swarup Nagar
Kanpur
6. Regional Directorate
National Productivity Council
1037, Sector 27 B
Chandigarh
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